What is claimed is:

1. An optical dispersion measurement apparatus comprising:

means for generating a light beam;

means for inputting the generated light beam to a first terminal of an optical distributor;

means for outputting the input light beam as a plurality of light beams;

optical modulation means for modulating at least two of the plurality of light beams;

an optical path via which the at least two modulated light beams are returned to the optical distributor;

means for outputting the light beams returned to the optical distributor from a second terminal of the optical distributor;

means for detecting light output from the second terminal; and

means for relating an intensity of the detected light to an optical modulation frequency.

2. An optical dispersion measurement apparatus comprising:

means for generating a light beam;

means for inputting the generated light beam to a first terminal of an optical distributor;

means for outputting the input light from a third terminal and a fourth terminal of the optical distributor;

light modulation means for modulating light traveling from the third terminal to the fourth terminal and light traveling from the fourth terminal to the third terminal;

means for outputting from a second terminal of the optical distributor modulated light traveling from the third terminal to the fourth terminal and from the fourth terminal to the third terminal;

means for detecting the light output from the second terminal; and

means for relating an intensity of the detected light to an optical modulation frequency.

3. An optical dispersion measurement apparatus comprising:

means for generating a light beam;

means for inputting the generated light beam to a first terminal of an optical distributor;

means for converting the light beam input to the first terminal of the optical distributor into two component beams having an orthogonal polarization relationship;

means for modulating one component beam before the beam is passed through a measurement object and modulating the other component beam after it has passed through the measurement object;

means for returning the two modulated component beams to the optical distributor;

means for outputting the two modulated component beams from a second terminal of the optical distributor;

means for detecting light having a predetermined polarization output from the

second terminal; and

means for relating an intensity of the detected light to an optical modulation frequency.

4. The apparatus according to claim 1, wherein said means for generating a light beam generates a wavelength-tunable light beam.

5. The apparatus according to claim 2, wherein said means for generating a light beam generates a wavelength-tunable light beam.

6. The apparatus according to claim 3, wherein said means for generating a light beam generates a wavelength-tunable light beam.

7. The apparatus according to claim 1, that further includes means for adjusting a length of the optical path used to return light output from the optical distributor back to the optical distributor.

8. The apparatus according to claim 2, that further includes means for adjusting a length of an optical path used to return light output from the optical distributor back to the optical distributor.

9. The apparatus according to claim 3, that further includes means for adjusting a length of an optical path used to return light output from the optical distributor back to the optical distributor.

10. The apparatus according to claim 1, wherein the optical distributor has first to fourth terminals, and that further includes first polarization control means for adjustment of light traveling from the third terminal to the fourth terminal, and second polarization control means for adjustment of light traveling from the fourth terminal to the third terminal.

11. The apparatus according to claim 2, further including first polarization control means for adjustment of light traveling from the third terminal to the fourth terminal, and second polarization control means for adjustment of light traveling from the fourth terminal to the third terminal.

12. The apparatus according to claim 1, wherein a measurement object is located on part of the optical path.

13. The apparatus according to claim 2, wherein a measurement object is located on part of the optical path.

14. The apparatus according to claim 3, wherein the measurement object is located on part of the optical path.

15. The apparatus according to claim 1, wherein part of the optical path comprises optical reflection means.

16. The apparatus according to claim 2, wherein part of an optical path comprises optical reflection means.

17. The apparatus according to claim 3 wherein part of an optical path comprises optical reflection means.

18. The apparatus according to claim 12, that further includes optical reflection means disposed at the measurement object.

19. The apparatus according to claim 13, that further includes optical reflection means disposed at the measurement object.

20. The apparatus according to claim 14, that further includes optical reflection means disposed at the measurement object.

21. The apparatus according to claim 1, further includes a 90-degree Faraday rotator provided on the optical path whereby light output from the second terminal of the optical distributor is increased when the light is not modulated compared to when the light is modulated, or is decreased when the light is not modulated compared to when the light is modulated.

22. The apparatus according to claim 2, further includes a 90-degree Faraday rotator provided on the optical path, whereby light output from the second terminal of the optical distributor is increased when the light is not modulated compared to when the light is modulated, or is decreased when the light is not modulated compared to when the light is modulated.

23. The apparatus according to claim 1, wherein said optical modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

24. The apparatus according to claim 2, wherein said light modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

25. The apparatus according to claim 3, wherein said means for modulating the component beams includes at least one pair of optical modulators having mutually opposed forward modulation directions.

26. The apparatus according to claim 4, wherein said optical modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

27. The apparatus according to claim 5, wherein said light modulation means includes at least one pair of optical modulators having mutually opposed forward

modulation directions.

28. The apparatus according to claim 6, wherein said means for modulating the component beams includes at least one pair of optical modulators having mutually opposed forward modulation directions.

29. The apparatus according to claim 7, wherein said optical modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

30. The apparatus according to claim 8, wherein said light modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

31. The apparatus according to claim 9, wherein said means for modulating the component beams includes at least one pair of optical modulators having mutually opposed forward modulation directions.

32. The apparatus according to claim 10, wherein said optical modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

33. The apparatus according to claim 11, wherein said light modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

34. The apparatus according to claim 12, wherein said optical modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

35. The apparatus according to claim 13, wherein said light modulation

means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

36. The apparatus according to claim 14, wherein said means for modulating the component beams includes at least one pair of optical modulators having mutually opposed forward modulation directions.

37. The apparatus according to claim 15, wherein said optical modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

38. The apparatus according to claim 16, wherein said light modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

39. The apparatus according to claim 17, wherein said means for modulating the component beams includes at least one pair of optical modulators having mutually opposed forward modulation directions.

40. The apparatus according to claim 18, wherein said optical modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

41. The apparatus according to claim 19, wherein said light modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

42. The apparatus according to claim 20, wherein said means for modulating the component beams includes at least one pair of optical modulators having mutually opposed forward modulation directions.

43. The apparatus according to claim 21, wherein said optical modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

44. The apparatus according to claim 22, wherein said light modulation means includes at least one pair of optical modulators having mutually opposed forward modulation directions.

45. A method of measurement of optical dispersion, comprising the steps of: using light generation means to generate a light beam;

inputting the generated light beam to a first terminal of an optical distributor;

outputting the input light beam as a plurality of light beams;

modulating at least two of the plurality of light beams;

returning the at least two light beams to the optical distributor;

outputting the returned light beams from a second terminal of the optical distributor;

detecting the light beams output from said second terminal; and

relating an intensity of the detected light to an optical modulation frequency.

46. A method of measurement of optical dispersion, comprising the steps of:

using light generation means to generate a light beam;

inputting the generated light beam to a first terminal of an optical distributor;

outputting the input light beam from third and fourth terminals of the optical distributor;

guiding the light beams output from the third and fourth terminals to a single optical path so that the beams travel along the optical path in mutually opposite directions;

modulating light traveling along the optical path from the third terminal to the fourth terminal and modulating light traveling along the optical path from the fourth terminal to the third terminal;

outputting to a second terminal of the optical distributor the modulated light traveling from the third terminal to the fourth terminal and the modulated light traveling from the fourth terminal to the third terminal;

detecting the light output from the second terminal;

finding a periodicity in a relationship between an optical modulation frequency and an optical intensity of the light output from the second terminal; and

obtaining a wavelength dispersion characteristic of the optical path from a dependency of the periodicity on a wavelength of the light input to the first terminal.

47. A method of measurement of optical dispersion, comprising the steps of:

using light generation means to generate a light beam;

inputting the generated light beam to a first terminal of an optical distributor;

converting the light beam input to the first terminal of the optical distributor into two component beams having an orthogonal polarization relationship;

modulating one of the component beams before the beam is passed through a measurement object and modulating the other component beam after it has been passed through the measurement object;

returning the two modulated component beams to the optical distributor;

outputting the two modulated component beams from a second terminal of the optical distributor;

detecting light having a predetermined polarization output from the second terminal; and

relating an intensity of the detected light to an optical modulation frequency.

48. A method of measurement of optical dispersion, comprising the steps of:

using light generation means to generate a light beam;

inputting the generated light beam to a first terminal of an optical distributor;

outputting the input light beam from third and fourth terminals of the optical distributor;

guiding the light beams output from the third and fourth terminals to a substantially single optical path so that the beams travel along the optical path in mutually opposite directions;

modulating light traveling along the optical path from the third terminal to the fourth terminal and modulating light traveling along the optical path from the fourth terminal to the third terminal, using a modulation signal having a periodic frequency that is not less than a periodicity found in an optical intensity relationship of light output from a second terminal of the optical distributor;

outputting from the second terminal of the optical distributor the modulated light traveling from the third terminal to the fourth terminal and the modulated light traveling from the fourth terminal to the third terminal;

detecting the light output from the second terminal;

finding a periodicity in a relationship between an optical modulation frequency and an optical intensity of the light output from the second terminal; and

using the periodicity to obtain a length of the optical path and changes in the length.

49. A method of measurement of optical dispersion, comprising the steps of:

using light generation means to generate a light beam;

inputting the generated light beam to a first terminal of an optical distributor;

converting the light beam input to the first terminal of the optical distributor into two component beams having an orthogonal polarization relationship;

modulating one of the component beams before the beam is passed through a measurement object, using a modulation signal having a periodic frequency that is not less than a periodicity found in an optical intensity relationship of light output from a second terminal of the optical distributor;

using another modulation signal having a same periodic frequency to modulate the other component beam after it has been passed through the measurement object;

returning the two modulated component beams to the optical distributor;

outputting the two modulated component beams from the second terminal of the optical distributor;

detecting light having a predetermined polarization output from the s cond terminal; and

relating an optical intensity of the detected light to an optical modulation

frequency; and

using the relationship to find a length of the optical path and changes in the length.

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